

# RF Exposure Evaluation Report

**Application No.:** SZEM2009009689CR  
**Applicant:** Mavenir Systems, Inc.  
**Address of Applicant:** 1700 International Parkway, Ste 200, Richardson, Texas 75081 USA  
**Manufacturer:** Mavenir Systems, Inc.  
**Address of Manufacturer:** 1700 International Parkway, Ste 200, Richardson, Texas 75081 USA  
**Factory:** Sunwave Communications Co., Ltd.  
**Address of Factory:** 581 Huoju Avenue, Binjiang District, Hangzhou, P.R.China Zip: 310053  
**Product Name:** Remote Radio Unit  
**Model No.(EUT):** DRRU-R3184848  
**FCC ID:** 2AWAS-910-00027  
**Standards:** 47 CFR Part 1.1307  
47 CFR Part 1.1310  
**Date of Receipt:** 2020-10-09  
**Date of Test:** 2020-10-10 to 2020-10-23  
**Date of Issue:** 2020-10-23

<b>Test Result :</b>	<b>PASS*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu  
EMC Laboratory Manager



## 2 Version

<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		2020-10-23		Original

<b>Authorized for issue by:</b>			
		<i>Edison Li</i>	
		<b>Edison Li /Project Engineer</b>	
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## 4 General Information

### 4.1 General Description of EUT

Product Name:	Remote Unit
Model No.:	DRRU-R3184848
Trade Mark:	MAVENIR
Sample Type:	Fixed production
Antenna Gain:	Antenna gain=6dBi
Power Supply:	DC48V
Optical Fiber:	200cm (unshielded)
DC Cable:	200cm (unshielded)
RF Cable:	200cm (shielded)
Type of Modulation	TDD
Frequency Band:	Downlink 3550MHz to 3700MHz
Modulation Type:	QPSK, 16QAM, 64QAM, 256QAM
Normal Output Power:	37dBm
System Gain:	37Db
CA Capability:	NA
MIMO:	2x2MIMO 4x4MIMO
Power Control Method:	ALC



## 4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China  
518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

## 4.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

## 4.4 Deviation from Standards

None.

## 4.5 Abnormalities from Standard Conditions

None.

## 4.6 Other Information Requested by the Customer

None.



## 5 RF Exposure Evaluation

### 5.1 RF Exposure Compliance Requirement

#### 5.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300 .....	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula:  $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi$  = 3.1416

R = distance between observation point and center of the radiator in 100cm

$P_d$  is the limit of MPE. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

#### 5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.



**5.1.3 EUT RF Exposure Evaluation**

**1) exposure conditions for standalone operations**

Output Power Into Antenna & RF Exposure Evaluation Antenna Gain:

<b>Operating frequency range: 3550~3700MHz</b>							
Tune-up Output Power (dBm)	Output Power (mW)	Minimum Distance to Human body (cm)	Maximun Antenna Gain (Numeric)	Maximun Antenna Gain (dBi)	Power density (mW/cm <sup>2</sup> )	Power density limit (mW/cm <sup>2</sup> )	MPE Ratio
43	19952.6	100	3.98	6	0.632	1.0	0.632

Remark:

- 1). This product support 4\*4 MIMO, the antenna is uncorrelated. Tune-up Output Power is the MIMO output power.

Conclusion:

The EUT comply with the RF exposure requirement and exclusion from RF exposure test.

- End of the Report -

